LIST OF CONTENTS

Number 1

M. Feinberg	1	**Review Article Number 26. Chemical reaction network structure and the stability of complex isothermal reactors—II. Multiple steady states for networks of deficiency one**
Z. Likidis and **K. Schügerl**	27	Continuous reactive extraction of penicillin G and its re-extraction in three different column types—a comparison
S. Skogestad and **M. Morari**	33	LV-control of a high-purity distillation column
G. Stephanopoulos and **G. R. Lapidus**	49	Chemostat dynamics of plasmid-bearing, plasmid-free mixed recombinant cultures
P. Marchal, R. David, J. P. Klein and **J. Villermaux**	59	Crystallization and precipitation engineering—I. An efficient method for solving population balance in crystallization with agglomeration
R. Franck, R. David, J. Villermaux and **J. P. Klein**	69	Crystallization and precipitation engineering—II. A chemical reaction engineering approach to salicylic acid precipitation: modelling of batch kinetics and application to continuous operation
A. Seidel and **D. Gelbin**	79	On applying the ideal adsorbed solution theory to multicomponent adsorption equilibria of dissolved organic components on activated carbon
M. Morbidelli and **A. Varma**	91	A generalized criterion for parametric sensitivity: application to thermal explosion theory
D. A. White	103	Optimization of precipitate production by co-current washing
J. Baldyga and **J. R. Bourne**	107	Micromixing in inhomogeneous turbulence
M. Sahimi and **T. T. Tsotsis**	113	Statistical modeling of gas–solid reaction with pore volume growth: kinetic regime
N. Sundaram and **P. C. Wankat**	123	Pressure drop effects in the pressurization and blowdown steps of pressure swing adsorption
		Shorter Communications
H. Merta and **J. Ziolo**	131	The calculation of a thickener cascade with the same thickening ratio
C. A. Tsiligiannis	134	Steady-state bifurcations and multiplicity conditions for lumped systems
		Book Review
C. McGreavy	137	Isotopic Assessment of Heterogeneous Catalysis

Number 2

M. F. Doherty and J. M. Ottino	139	**Review Article Number 27. Chaos in deterministic systems: strange attractors, turbulence, and applications in chemical engineering**
M. Novák, K. Ehrhardt, K. Klusáček and P. Schneider	185	Dynamics of non-isobaric diffusion in porous catalysts
S. S. Bhagwat and M. M. Sharma	195	Intensification of solid–liquid reactions: microemulsions
R. Aris, P. Gray and S. K. Scott	207	Modelling cubic autocatalysis by successive bimolecular steps
D. S. van Vuuren	213	The transient response of bubble columns
F. J. Doering, M. L. Unland and D. A. Berkel	221	Modelling of SO_2 oxidation rates based on kinetic data of a Cs/V catalyst at high pressures and conversions
S. T. Kolaczkowski, P. Crumpton and A. Spence	227	Modelling of heat transfer in non-adiabatic monolithic reactors
M. J. Slater, M. H. I. Baird and T.-B. Liang	233	Drop phase mass transfer coefficients for liquid–liquid systems and the influence of packings
J.-I. Kim and P. Stroeve	247	Mass transfer in separation devices with reactive hollow fibers
M. Muraki and T. Hayakawa	259	Synthesis of a multicomponent multiproduct separation process with nonsharp separators
K. S. Pedersen, P. Thomassen and A. Fredenslund	269	On the dangers of "tuning" equation of state parameters
D. C. Shallcross, C. C. Herrmann and B. J. McCoy	279	An improved model for the prediction of multicomponent ion exchange equilibria
R. Vaidyanathan and C. Tien	289	Hydrosol deposition in granular beds
O. J. Wimmers and J. M. H. Fortuin	303	The use of adhesion of catalyst particles to gas bubbles to achieve enhancement of gas absorption in slurry reactors—I. Investigation of particle-to-bubble adhesion using the Bubble Pick-up method
O. J. Wimmers and J. M. H. Fortuin	313	The use of adhesion of catalyst particles to gas bubbles to achieve enhancement of gas absorption in slurry reactors—II. Determination of the enhancement in a bubble-containing slurry reactor
T. M. Leib, D. Rumschitzki and M. Feinberg	321	Multiple steady states in complex isothermal CFSTRs—I. General considerations
D. Rumschitzki and M. Feinberg	329	Multiple steady states in complex isothermal CFSTRs—II. Homogeneous reactors
C. A. Tsiligiannis and S. A. Svoronos	339	Dynamic interactors in multivariable process control—I. The general time delay case
W. J. Korchinsky	349	A dispersion–entrainment model for liquid–liquid extraction column performance prediction
H. Sawistowski and P. A. Pilavakis	355	Performance of esterification in a reaction–distillation column
R. L. Rowley, G. L. White and M. Chiu	361	Ternary liquid mixture thermal conductivities

A. N. Sembira, J. C. Merchuk and **D. Wolf**	373	Characteristics of a motionless mixer for dispersion of immiscible fluids—III. Dynamic behaviour of the average drop size and dispersed phase hold-up
A. K. Bińi	379	Minimum air entrainment velocity of vertical plunging liquid jets
		Shorter Communications
C. Kaas-Petersen and **S. K. Scott**	391	Stationary-state and Hopf bifurcation patterns in isothermal reaction–diffusion systems
D. C. Dixon	392	Simplified thickener dynamic analysis
S. Pushpavanam and **R. Narayanan**	394	Uniqueness conditions for steady solutions in the case of m-th order reactions—non-isothermal pellets with variable transport coefficients
		Letters to the Editors
A. Jutan	397	Comments on dynamic simulation of plug flow packed bed reactors
W. Rutzler	398	Author's reply to comments by A. Jutan
R. P. Chhabra	399	Comments on drag and mass transfer in multiple drop slow motion in a power law fluid
A. B. Jarzębski and **J. J. Malinowski**	400	Authors' reply to comments by R. P. Chhabra
		Book Reviews
H. Hofmann	403	Chemistry Data Series: Vol. II, Parts 1 and 2, Critical Data of Pure Substances; Vol. IX, Parts 1 and 2, Activity Coefficients at Infinite Dilution. Edited by D. Behrens and R. Eckermann
A. Lyddiatt	403	Advanced Biochemical Engineering. Edited by Bungay and G. Belfort
M. Biddulph	404	Distillation Tray Fundamentals. By M. J. Lockett

Number 3

D. M. Lorbach and **T. A. Hatton**	405	Polydispersity and backmixing effects in diffusion controlled mass transfer with irreversible chemical reaction: an analysis of liquid emulsion membrane processes
H. Jüntgen, E. Richter, K. Knoblauch and **T. Hoang-Phu**	419	Catalytic NO_x reduction by ammonia on carbon catalysts
K. Ravindranath and **R. A. Mashelkar**	429	Analysis of the role of stripping agents in polymer devolatilization
J. Llorens, C. Mans and **J. Costa**	443	Discrimination of the effects of surfactants in gas absorption
M. Y. Chisti, B. Halard and **M. Moo-Young**	451	Liquid circulation in airlift reactors
D. E. Mainwaring, R. J. Sadus and **C. L. Young**	459	Deiters' equation of state and critical phenomena
K. Wichterle	467	Conditions for suspension of solids in agitated vessels
Z. Kemblowski and **P. Pustelnik**	473	Residence time distribution of a power-law fluid in Kenics static mixers

J. Ravi Prakash and K. Kesava Rao	479	Steady compressible flow of granular materials through a wedge-shaped hopper: the smooth wall, radial gravity problem
B. P. Cairns and I. A. Furzer	495	Sensitivity testing with the predictive thermodynamic models NRTL, UNIQUAC, ASOG and UNIFAC in multi-component separations of methanol–acetone–chloroform
T. Salmi	503	Modelling and simulation of transient states of ideal heterogeneous catalytic reactors
M. C. Regalbuto, W. Strieder and A. Varma	513	Approximate solutions for nonlinear diffusion-reaction equations from the Maximum Principle
M. Sheintuch and D. Hefer	519	Dynamic behavior of inhomogeneous solutions in catalysts with self-inhibited reactions
D. Barbosa and M. F. Doherty	529	The influence of equilibrium chemical reactions on vapor–liquid phase diagrams
D. Barbosa and M. F. Doherty	541	The simple distillation of homogeneous reactive mixtures
M. Shapiro and H. Brenner	551	Dispersion of a chemically reactive solute in a spatially periodic model of a porous medium
G. F. Versteeg and W. P. M. van Swaaij	573	On the kinetics between CO_2 and alkanolamines both in aqueous and non-aqueous solutions—I. Primary and secondary amines
G. F. Versteeg and W. P. M. van Swaaij	587	On the kinetics between CO_2 and alkanolamines both in aqueous and non-aqueous solutions—II. Tertiary amines
P. Glavič, Z. Kravanja and M. Homšak	593	Heat integration of reactors—I. Criteria for the placement of reactors into process flowsheet
H. Kehlen, M. T. Rätzsch and J. Bergmann	609	Continuous kinetics of first order degradation reactions in polydisperse mixtures
P. A. Houghton, R. U. Madurawe and T. A. Hatton	617	Convective and dispersion models for dispersed phase axial mixing—the significance of polydispersity effects in liquid–liquid contactors
A. K. Sen	641	Enhancement factors for gas absorption with chemical reaction: approximate analytical solutions
A. Koshy, T. R. Das and R. Kumar	649	Effect of surfactants on drop breakage in turbulent liquid dispersions
R. O. Fox and L. T. Fan	655	Application of the master equation to coalescence and dispersion phenomena
M. M. Clark	671	Drop breakup in a turbulent flow—I. Conceptual and modeling considerations
M. M. Clark	681	Drop breakup in a turbulent flow—II. Experiments in a small mixing vessel
O. Iordache, R. Isopescu, A. Isopescu, A. Iacobini and G. Jinescu	693	Non-Archimedean models of mixing—I. Residence time distribution for systems with imperfect mixing
O. Iordache, R. Isopescu, A. Isopescu, A. Iacobini and G. Jinescu	699	Non-Archimedean models of mixing—II. A nearly dispersional model for packed bed thermal storage systems

C. B. Ching, C. Ho and D. M. Ruthven	703	Experimental study of a simulated counter-current adsorption system—VI. Non-linear systems
S. Asai, J. Hatanaka, H. Maeda and T. Tani	713	Mass transfer in a liquid–liquid jet with cocurrent laminar flow
O. Stenberg and B. Andersson	719	Gas–liquid mass transfer in agitated vessels—I. Evaluation of the gas–liquid mass transfer coefficient from transient-response measurements
O. Stenberg and B. Andersson	725	Gas–liquid mass transfer in agitated vessels—II. Modelling of gas–liquid mass transfer
		Shorter Communication
R. J. Dry and I. N. Christensen	731	Periodic density-inversion effects in a high-velocity fluidized bed
		Book Review
J. P. Norton	735	Chemical Process Control—CPCIII. Edited by M. Morari and T. J. McAvoy
		Announcement
	737	Second International Symposium on Two-phase Annular and Dispersed Flows
		Number 4
F. Berruti, A. G. Liden and D. S. Scott	739	Measuring and modelling residence time distribution of low density solids in a fluidized bed reactor of sand particles
K.-Y. Choi and A. A. Khan	749	Optimal state estimation in the transesterification stage of a continuous polyethylene terephthalate condensation polymerization process
S. Zrnčević and D. Rušić	763	Verification of the kinetic model for benzene hydrogenation by poisoning experiment
D. A. Drew	769	The lift force on a small sphere in the presence of a wall
J. Hart, J. Ellenberger and P. J. Hamersma	775	Single- and two-phase flow through helically coiled tubes
A. Corma, F. Llopis, J. B. Monton and S. W. Weller	785	Comparison of models in heterogeneous catalysis for ideal and non-ideal surfaces
H. S. Kheshgi and L. E. Scriven	793	The evolution of disturbances in horizontal films
E. Kvaalen and D. Tondeur	803	Constraints on phase equilibrium equations
C. M. Marb and D. Vortmeyer	811	Multiple steady states of a crossflow moving bed reactor: theory and experiment
P. K. OuYoung, H. N. Chang and M. Moo-Young	821	Determination of gas–liquid mass transfer coefficient in a bubbie column by an eigenvalue method
B. D. Crittenden and N. J. Alderman	829	Negative fouling resistances: the effect of surface roughness
A. H. Abdel-Hafez	839	Simplified overall rate expression for shrinking-core bituminous char combustion
A. Doniec	847	Flow of a laminar liquid film down a vertical surface
H. Soeberg	855	Viscous flow in curved tubes—I. Velocity profiles

Y.-H. Ju and **W.-C. Lee**	863	Derivation of an interface condition for interfaces that possess mass capacity
H. Abichandani and **S. C. Sarma**	871	Heat transfer and power requirements in horizontal thin film scraped surface heat exchangers
R. J. Sadus and **C. L. Young**	883	Critical properties of ternary mixtures: siloxane and perfluoromethylcyclohexane mixtures
R. A. Adomaitis and **A. Çinar**	887	The bifurcation behavior of an autothermal packed bed tubular reactor
A. Mehra	899	Intensification of multiphase reactions through the use of a microphase—I. Theoretical
A. Mehra, A. Pandit and **M. M. Sharma**	913	Intensification of multiphase reactions through the use of a microphase—II. Experimental
G. P. Rangaiah and **P. R. Krishnaswamy**	929	Gamma distribution model—a limiting form of gamma distributed time delay model
D. Ramkrishna and **P. Arce**	933	Self-adjoint operators of transport in interacting solid–fluid systems—II.
V. R. Dabholkar, V. Balakotaiah and **D. Luss**	945	Travelling waves in multi-reaction systems
V. Balakotaiah and **D. Luss**	957	Global mapping of parameter regions with a specific number of solutions
K. J. Kim and **K. Y. Choi**	965	Steady state behavior of a continuous stirred tank reactor for styrene polymerization with bifunctional free radical initiators
		Shorter Communication
R. Di Felice, L. G. Gibilaro and **P. U. Foscolo**	979	On the inversion of binary-solid liquid fluidised beds
		Letters to the Editors
K. F. Jensen	983	Comments on chemical vapor deposition of silicon under reduced pressure in hot-wall reactors
C. G. Takoudis	984	Author's reply to comments by K. F. Jensen
		Book Reviews
G. McKay	985	Gas Separation by Adsorption Processes. By R. T. Yang
H. A. Chase	986	Fermentation Kinetics and Modelling. By C. G. Sinclair and B. Kristiansen. Edited by J. D. Bu'lock
	987	Corrigendum
		Announcement
	989	International Conference on Advances in Chemical Engineering
		Number 5
		Announcement
	iii	Third P. V. Danckwerts Memorial Lecture
S. Kim and **C. J. Lawrence**	991	**Review Article Number 28. Suspension mechanics for particle contamination control**
S. Farooq, M. M. Hassan and **D. M. Ruthven**	1017	Heat effects in pressure swing adsorption systems

R. J. Dry, I. N. Christensen and **G. C. Thomas**	1033	The effect of naturally-occurring interparticle forces on the fluidisation characteristics of fine iron oxide powders
M. A. Reuter, J. S. J. van Deventer, J. C. A. Green and **M. Sinclair**	1039	Optimal design of mineral separation circuits by use of linear programming
E. J. Westerink and **K. R. Westerterp**	1051	Safe design of cooled tubular reactors for exothermic multiple reactions: multiple-reaction networks
A. Mehra and **M. M. Sharma**	1071	Absorption of hydrogen sulfide in aqueous solutions of iodides containing dissolved iodine: enhancements in rates due to precipitated sulfur
U. Tüzün, M. J. Adams and **B. J. Briscoe**	1083	An interface dilation model for the prediction of wall friction in a particulate bed
Y.-L. Hwang and **F. G. Helfferich**	1099	Dynamics of continuous countercurrent mass-transfer processes—II. Single-component systems with nonlinear equilibria
J. M. Loureiro, C. A. Costa and **A. E. Rodrigues**	1115	Recovery of copper, zinc and lead from liquid streams by chelating ion exchange resins
R. J. Grau, A. E. Cassano and **M. A. Baltanás**	1125	Shunt reactions in methyl linolenate hydrogenation using a supported Ni catalyst
G. McKay and **B. Al-Duri**	1133	Prediction of bisolute adsorption isotherms using single-component data for dye adsorption onto carbon
T. Salmi, P. Martikainen, E. Paatero, L. Hummelstedt, H. Damén and **T. Lindroos**	1143	Kinetic model for the synthesis of monochloroacetic acid
L. Nilsson and **R. Wimmerstedt**	1153	Residence time distribution and particle dispersion in a longitudinal-flow fluidized bed
D. Pošarac and **D. Petrović**	1161	An experimental study of the minimum fluidization velocity in a three-phase external-loop air-lift reactor
K. Tsuchiya and **L.-S. Fan**	1167	Near-wake structure of a single gas bubble in a two-dimensional liquid–solid fluidized bed: vortex shedding and wake size variation
P. Alvfors and **G. Svedberg**	1183	Modelling of the sulphation of calcined limestone and dolomite—a gas–solid reaction with structural changes in the presence of inert solids
		Shorter Communications
K. Kumbilieva, M. M. Kostjukovsky, L. Petrov and **S. L. Kiperman**	1195	Effects of intraparticle diffusion resistance on catalytic reactions over decaying catalysts
M. A. Soliman	1198	A modified one-point collocation method for diffusion-reaction problems
E. Tsotsas and **E. U. Schlünder**	1200	Some remarks on channelling and on radial dispersion in packed beds
M. M. Sharma	1203	Streaming potentials in inhomogeneous packed beds
H.-B. Lin and **W. E. King**	1206	Steady-state solution of a nonlinear diffusion-reaction problem with a discontinuous boundary condition using orthogonal collocation on finite elements
J. Sawinsky, A. Balint and **S. Bende**	1209	Conversion for laminar flow of Bingham plastic fluids in an isothermal tube reactor

Letter to the Editors

W. R. Paterson 1213 On the dominant-term method

Book Reviews

N. Thomas 1215 Flowfield Modeling and Diagnostics. By A. K. Gupta and D. G. Lilley

C. R. Thomas 1217 Bioreaction Engineering—Reactions Involving Microorganisms and Cells, Vol. 1. By K. Schügerl

J. P. Norton 1218 Discrete-time Control Systems. By K. Ogata

H. Hofmann 1218 Transport Processes in Chemically Reacting Flow Systems. By D. E. Rosner

J. C. R. Turner 1219 Introduction to Chemical Engineering Thermodynamics. By J. M. Smith and H. C. Van Ness

1221 Errata

Number 6

J. Bridgwater iii Editorial

M. V. Ramana Rao, P. M. Plehiers and G. F. Froment 1223 The coupled simulation of heat transfer and reaction in a pyrolysis furnace

C.-C. Fu, J. M. Smith and B. J. McCoy 1231 Dynamic analysis of homogeneous reactions in a stirred bubble reactor: oxidation of sulfite

Z. Likidis and K. Schügerl 1243 Simulation of the continuous re-extraction of penicillin G from the solution of its ion-pair complex in three different types of bench-scale column

K. Niranjan, M. A. Hashim, A. B. Pandit and J. F. Davidson 1247 Liquid-phase controlled mass transfer from a gas slug

L. Gradoń, P. Grzybowski and W. Pilaciński 1253 Analysis of motion and deposition of fibrous particles on a single filter element

K. Sujatha, T. R. Das, R. Kumar and K. S. Gandhi 1261 Permeation of gases through liquid films

H. Moon and C. Tien 1269 Incorporation of the potential theory into liquid-phase multicomponent adsorption calculations

C.-S. Tan 1281 Effectiveness factors of n-th order reactions for incomplete wetting particles in trickle-bed reactors

B. W. Brooks 1287 Semi-batch reactors and their use for autocatalytic reactions

D. S. van Vuuren, J. R. Hunter and M. D. Heydenrych 1291 The solubility of various gases in Fischer–Tropsch reactor wax

A. G. Dixon and Y. H. Ma 1297 A comparison of moment methods for non-isobaric gas chromatography columns

J. L. Chevalier, P. Petrino and Y. Gaston-Bonhomme 1303 Estimation method for the kinematic viscosity of a liquid-phase mixture

K.-Y. Hsu and S.-A. Chen 1311 Minimum end-time policies for batchwise radical chain polymerization: the piecewise initiator addition policy

R. P. Borwankar and **D. T. Wasan**	1323	Equilibrium and dynamics of adsorption of surfactants at fluid–fluid interfaces
O. Lev, A. Wolffberg, M. Sheintuch and **L. M. Pismen**	1339	Bifurcations to periodic and chaotic motions in anodic nickel dissolution
K. Kitano and **L.-S. Fan**	1355	Near-wake structure of a single gas bubble in a two-dimensional liquid–solid fluidized bed: solids holdup
J. Tobiś and **D. Vortmeyer**	1363	The near-wall channelling effect on isothermal constant-pattern adsorption
J. N. Tilton	1371	The steady motion of an interface between two viscous liquids in a capillary tube
D. Nicholson, J. K. Petrou and **J. H. Petropoulos**	1385	Relation between macroscopic conductance and microscopic structural parameters of stochastic networks with application to fluid transport in porous materials
Y. G. Seo and **W. K. Lee**	1395	Single-eddy model for random surface renewal
J. Kubie	1403	Influence of containing walls on the distribution of voidage in packed beds of uniform spheres
		Shorter Communications
O. T. Hanna, O. C. Sandall and **G. Ruiz-Ibanez**	1407	Turbulent mass transfer on a rotating disk
E. E. Gonzo, J. C. Gottifredi and **L. C. Romero**	1410	Effectiveness factors and selectivity for parallel catalytic reactions with Langmuir–Hinshelwood kinetics
B. Abedian	1414	The diffuse double layer in hydrocarbon liquids
H. Oguz and **A. Brehm**	1416	Mass-transfer coefficients in organic slurries with mechanical agitation and sparging
L. R. Glicksman	1419	Scaling relationships for fluidized beds
A. Löwe and **K. Rajeswar Rao**	1421	Simulation of Wei–Prater experiments for non-linear reaction systems in a concentration-controlled recycle reactor
		Book Review
J. Benbow	1425	Catalyst Supports and Supported Catalysts: Theoretical and Applied Concepts. Edited by A. B. Stiles

Number 7

	v	Third P. V. Danckwerts Memorial Lecture
O. Levenspiel	1427	Third P. V. Danckwerts Memorial Lecture presented at the Institute of Directors, London, U.K., 4 May 1988: Chemical engineering's grand adventure
J. S. Vrentas and **C. M. Vrentas**	1437	Transport effects in low-pressure chemical vapor deposition reactors
A. Heim and **W. Antkowiak**	1447	A mathematical model for granulation kinetics
P. A. Gauglitz and **C. J. Radke**	1457	An extended evolution equation for liquid film breakup in cylindrical capillaries
G. F. Andrews, R. Fike and **S. Wong**	1467	Bubble hydrodynamics and mass transfer at high Reynolds number and surfactant concentration
G. C. Frye and **J. C. Berg**	1479	Interactions between surface-active species in evanescent foams

T. D. Papathanasiou, N. Kalogerakis and L. A. Behie	1489	Dynamic modelling of mass transfer phenomena with chemical reaction in immobilized-enzyme bioreactors
M. R. Davidson	1499	Similarity solutions for flow in hydrocyclones
R. M. Nedderman	1507	The measurement of the velocity profile in a granular material discharging from a conical hopper
M. Sklivaniotis, J. A. A. Castro and C. McGreavy	1517	Characteristic features of parametric sensitivity in a fixed-bed heat exchanger
D. Barbosa and M. F. Doherty	1523	Design and minimum-reflux calculations for single-feed multicomponent reactive distillation columns
K. Najim and M. V. Le Lann	1539	Multivariable learning control of an extractor
N. N. Clark and C. M. Atkinson	1547	Amplitude reduction and phase lag in fluidized-bed pressure measurements
R. Muralidhar, D. Ramkrishna, P. K. Das and R. Kumar	1559	Coalescence of rigid droplets in a stirred dispersion—II. Band-limited force fluctuations
J. B. L. M. Campos and J. R. F. Guedes de Carvalho	1569	Mixing induced by air slugs rising in narrow columns of water
L. Bass, A. J. Bracken and H. S. Green	1583	Boundary layers and images in dispersed flow reactors: a Green's function approach
J.-D. Kim, C. T. Lim, K.-J. Lee and Y. Y. Lee	1591	Chemical equilibria of isobutylene–acid mixtures
Gh. Juncu, O. Muntean and R. Mihail	1599	Influence of reactor operating conditions on gas–liquid reaction performance
D. De Kee, M. Schlesinger and M. Godo	1603	Postwithdrawal drainage of different types of fluids
B. Tabiś	1615	Iterative method for a fluidized bed reactor computation
R. Chein and J. N. Chung	1621	Particle dynamics in a gas–particle flow over normal and inclined plates
M. Caycik and D. J. Gunn	1637	True mean velocities in the wall and bulk regions of fixed beds
H. Yoshida, T. Kataoka and D. M. Ruthven	1647	Dynamic behaviour of an adiabatic adsorption column—III. Analytical solutions for irreversible adsorption
U. Zell, R. Shamekhi and P. Roth	1657	Waste water combustion in laboratory swirl burners—I. Arrangements and burning conditions
U. Zell, R. Shamekhi and P. Roth	1667	Waste water combustion in laboratory swirl burners—II. No formation from dissolved N-compounds
R. Pohorecki and W. Moniuk	1677	Kinetics of reaction between carbon dioxide and hydroxyl ions in aqueous electrolyte solutions
V. N. Burganos and S. V. Sotirchos	1685	Simulation of Knudsen diffusion in random networks of parallel pores
F. M. Tiller and W. Chen	1695	Limiting operating conditions for continuous thickeners
		Shorter Communications
C. P. Tsamalis and S. Szépe	1705	On diffusional effects in partially impregnated catalysts
S. K. Scott and W. W. Farr	1708	Dynamic fine structure in the cubic autocatalator

G. Reschke, G. Bunke, A. Seidel and D. Gelbin	1710	Using liquid chromatographic texture analysis of activated carbons for calculating breakthrough curves
T. Funazukuri, P. L. Silveston and N. Wakao	1713	Activation energy of heterogeneous chemical reactions under external transport control
W. R. Paterson and P. J. Fryer	1714	A reaction engineering approach to the analysis of fouling
		Book Reviews
R. W. K. Allen	1719	Needle Felts in Gas and Dust Filtration. By G. J. I. Igwe
D. J. Stephens	1719	Application of Optimal Control Theory to Enhanced Oil Recovery. By W. F. Ramirez
	1721	Corrigenda

Number 8

Special Issue: ISCRE 10

	ix	Preface
	xi	List of reviewers
		Plenary papers
J. Villadsen	1725	Challenges and cul-de-sacs in reactor modelling
J.-M. Engasser	1739	Bioreactor engineering: the design and optimization of reactors with living cells
M. M. Sharma	1749	Multiphase reactions in the manufacture of fine chemicals
R. Gygax	1759	Chemical reaction engineering for safety
E. L. Paul	1773	Design of reaction systems for specialty organic chemicals
H. Wiederkehr	1783	Examples of process improvements in the fine chemicals industry
		For Shinnar paper see p. 2303
		Technical session A: modelling and control
K. J. Klingman and H. H. Lee	1795	A1. A model for catalytic reactions in packed beds based on alternating flow model
M. A. Soliman, S. S. E. H. El-Nashaie, A. S. Al-Ubaid and A. Adris	1801	A2. Simulation of steam reformers for methane
Gy. Marton, M. Kovacs, V. Oreopoulou and E. G. Koukios	1807	A3. Modelling of biomass fractionation by prehydrolysis–delignification
A. Kilpinen	1813	A4. An on-line model for estimating the melting zone in a blast furnace
A. Kumar and P. K. Khandelwal	1819	A5. Modelling of multifunctional step growth polymerization in presence of cyclization
W. M. Edwards and H. N. Kim	1825	A6. Multiple steady states in FCC unit operations

G. L. Rorrer, W. R. Mohring, D. T. A. Lamport and M. C. Hawley	1831	A7. A detailed kinetic and heat transport model for the hydrolysis of lignocellulose by anhydrous hydrogen fluoride vapor
S. Saim and B. Subramaniam	1837	A8. Chemical reaction equilibrium at supercritical conditions
S. Sicardi, G. Baldi, L. van Dierendonck and T. Smeets	1843	A9. Comparison between batch and continuous tubular reactors used for the study of reaction kinetics in heterogeneous systems
M. Masi, M. Sangalli, S. Carra, G. Cao and M. Morbidelli	1849	A10. Kinetics of ethylene hydrogenation on supported platinum. Analysis of multiplicity and nonuniformly active catalyst particle behavior
P. A. Galtier, A. A. Forestière, Y. H. Glaize and J. P. Wauquier	1855	A11. Mathematical modeling of ethylene oligomerization
C. McGreavy and L. Han	1861	A12. Operational flexibility and stability in relation to optimal design of reactors
B. B. Fish, R. W. Carr and R. Aris	1867	A13. Computer aided experimentation in countercurrent reaction chromatography and simulated countercurrent chromatography
R. Mann and P. N. Sharratt	1875	A14. Diffusion and consecutive reactions in stochastic pore networks
		Technical session B: biotechnology
O. Vashitz, S. Ulitzur and M. Sheintuch	1883	B1. Mass transfer, batch and continuous kinetics, in a luminous strain of *Xanthomonas campestris*
A. Gianetto, B. Ruggeri, V. Specchia, G. Sassi and R. Forna	1891	B2. Continuous extraction loop reactor (CELR): alcoholic fermentation by fluidized entrapped biomass
I. J. Dunn, E. Heinzle, B. Dettwiler, U. Saner, G. Ryhiner and J. Ingham	1897	B3. Application of digital simulation languages with personal computers in chemical and biochemical engineering education
M. Griot, U. Saner, E. Heinzle, I. J. Dunn and J. R. Bourne	1903	B4. Fermenter scale-up using an oxygen-sensitive culture
M. N. Pons, A. Rajab, J. M. Flaus, J. M. Engasser and A. Cheruy	1909	B5. Comparison of estimation methods for biotechnological processes
Y. Shi and W.-K. Yuan	1915	B6. Application of adaptive estimation in microbial fermentation processes
		Technical session C: mixing
P. Andrigo, R. Bagatin, P. Cavalieri d'Oro, C. Perego and L. Raimondi	1923	C1. Micromixing in a chemical quenching apparatus for fast kinetics
S. Rohani	1929	C2. Measurement of partial segregation via step response analysis of reactive tracers
P. Arrojo, C. Dopazo, L. Valiño and W. P. Jones	1935	C3. Numerical simulation of velocity and concentration fields in a continuous flow reactor
J. R. Bourne, H. Gablinger and K. Ravindranath	1941	C4. Local pH gradients and the selectivity of fast reactions—I. Mathematical model of micromixing

R. Pohorecki and **J. Baldyga**	1949	C5. The effects of micromixing and the manner of reactor feeding on precipitation in stirred tank reactors
T. Meyer, R. David, A. Renken and **J. Villermaux**	1955	C6. Micromixing in a static mixer and an empty tube by a chemical method
D. F. Ryan, L. P. B. M. Janssen and **L. L. van Dierendonck**	1961	C7. Circulation time prediction in the scale-up of polymerization reactors with helical ribbon agitators
J. H. Frey and **C. D. Denson**	1967	C8. Imidization reaction parameters in inert molten polymers for micromixing tracer studies
J. Schütz	1975	C9. Agitated thin-film reactors and tubular reactors with static mixers for a rapid exothermic multiple reaction
		Technical session D: special reactor systems and chemicals
S. Irandoust and **B. Andersson**	1983	D1. Mass transfer and liquid-phase reactions in a segmented two-phase flow monolithic catalyst reactor
K. Scott and **B. Hayati**	1989	D2. A model for fluid/fluid reactions using electrochemically generated mediators
C. K. Lee and **A. Varma**	1995	D3. An isothermal fixed-bed reactor with nonuniformly active catalysts: experiments and theory
I. F. McConvey, J. M. Henderson and **K. Scott**	2001	D4. Application of modelling and simulation to electro-organic reaction processes to enhance process control strategy
J. Coca, G. Adrio and **S. Langer**	2007	D5. Dicyclopentadiene dissociation in a chromatographic reactor using a liquid crystal as stationary phase
F. B. Thomas, P. A. Ramachandran, M. P. Duduković and **R. E. W. Jansson**	2013	D6. The effect of flow on mixing and performance of radial flow electrochemical reactors
D.-H. Wang and **H.-S. Weng**	2019	D7. Preliminary study on the role played by the third liquid phase in phase transfer catalysis
J. H. Kim, E. D. Sudol, M. S. El-Aasser, J. W. Vanderhoff and **D. M. Kornfeld**	2025	D8. Preparation of large-particle-size monodisperse latexes in a rotating-cylinder reactor
M. Kastelic, I. Oh, C. G. Takoudis, J. A. Friedrich and **G. W. Neudeck**	2031	D9. Selective epitaxial growth of silicon in pancake reactors
T. Furusawa, T. Kojima and **H. Hiroha**	2037	D10. Chemical vapor deposition and homogeneous nucleation in monosilane pyrolysis within interparticle spaces—application of fines formation analysis to fluidized bed CVD
		Technical session E: emission control and recycling
M. Hartman, K. Svoboda, O. Trnka and **V. Veselý**	2045	E1. Reaction of sulphur dioxide with magnesia in a fluidised bed
J. C. Schouten and **C. M. van den Bleek**	2051	E2. The influence of oxygen-stoichiometry on desulfurization during FBC: a simple sure modeling approach
Y. Sh. Matros, A. S. Noskov, V. A. Chumachenko and **O. V. Goldman**	2061	E3. Theory and application of unsteady catalytic detoxication of effluent gases from sulfur dioxide, nitrogen oxides and organic compounds

H. G. Stenger, Jr., E. C. Meyer, J. S. Hepburn and C. E. Lyman	2067	E4. Nitric oxide reduction using co-impregnated rhodium on an alumina Celcor honeycomb
D. W. Agar and W. Ruppel	2073	E5. Extended reactor concept for dynamic DeNOx design
J. Li and A. R. P. van Heiningen	2079	E6. Kinetics of sodium sulfate reduction in the solid state by carbon monoxide
C. J. Pereira, J. E. Kubsh and L. L. Hegedus	2087	E7. Computer-aided design of catalytic monoliths for automobile emission control
A.-M. Strömberg and H. T. Karlsson	2095	E8. Limestone based spray dry scrubbing of SO_2
A. P. Dhupe, A. N. Gokarn and L. K. Doraiswamy	2103	E9. A novel regenerable sorbent for SO_2
G. Eigenberger and U. Nieken	2109	E10. Catalytic combustion with periodic flow reversal
		Technical session F: safety
Z. Meissner and A. Kołaczkowski	2119	F1. Safety aspects of the purification of waste water containing ammonium nitrate
M. Steensma and K. R. Westerterp	2125	F2. Thermally safe operation of a cooled semi-batch reactor. Slow liquid–liquid reactions
C.-U. Schmidt and K.-H. Reichert	2133	F3. Reaction calorimeter: a contribution to safe operation of exothermic polymerizations
K. Brooks, S. Bradshaw and D. Glasser	2139	F4. Spontaneous combustion of coal stockpiles—an unusual chemical reaction engineering problem
P. Hugo, J. Steinbach and F. Stoessel	2147	F5. Calculation of the maximum temperature in stirred tank reactors in case of a breakdown of cooling
		Technical session G: multiphase reactors
O. J. Wimmers, H. J. J. de Sauvage Nolting and J. M. H. Fortuin	2155	G1. The effect of the size of catalyst particles adhering to gas bubbles on the enhancement of gas absorption in slurry reactors
G. H. Graaf, J. G. M. Winkelman, E. J. Stamhuis and A. A. C. M. Beenackers	2161	G2. Kinetics of the three phase methanol synthesis
W. von Wedel, S. Ledakowicz and W.-D. Deckwer	2169	G3. Kinetics of methanol synthesis in the slurry phase
V. LaVopa and C. N. Satterfield	2175	G4. Some effects of vapor–liquid equilibria on performance of a trickle-bed reactor
R. D. Holstvoogd, W. P. M. van Swaaij and L. L. van Dierendonck	2181	G5. The absorption of gases in aqueous activated carbon slurries enhanced by adsorbing or catalytic particles
F. J. M. Schrauwen and D. Thoenes	2189	G6. Selective gas absorption in a cyclone spray scrubber
C. Zheng, B. Yao and Y. Feng	2195	G7. Flow regime identification and gas hold-up of three-phase fluidized systems
M. J. Ellman, N. Midoux, A. Laurent and J. C. Charpentier	2201	G8. A new, improved pressure drop correlation for trickle-bed reactors

A. C. van't Hoog and **L. van Raam**	2207	G9. A hypothesis on the effect of the bubble wake on coalescence in three-phase fluidised beds
R. Samson, C. E. Brakel, A. M. Scott, K. Chandrasekharan and **P. Veenstra**	2215	G10. A bubble model describing the influence of internals on gas fluidization
S. J. Tremont, P. L. Mills and **P. A. Ramachandran**	2221	G11. Catalytic hydrodesulfurization of a specialty agricultural chemical intermediate
K. R. Westerterp, K. B. van Gelder, H. J. Janssen and **M. H. Oyevaar**	2229	G12. Development of catalytic hydrogenation reactors for the fine chemicals industry
		Technical session H: catalytic reactors
C. E. Megiris and **J. B. Butt**	2239	H1. Effects of poisoning on the dynamics of fixed bed reactors: cyclic and temperature-increased operational policies
E. Müller-Erlwein and **H. Hofmann**	2245	H2. Determination of kinetic parameters from dynamic investigations of heterogeneously catalyzed reactions
H. U. Onken and **E. E. Wolf**	2251	H3. Coupled chemical oscillators on a Pt/SiO_2 catalyst disk
W. E. Stewart, R. H. Shabaker and **Y. T. Lu**	2257	H4. Kinetics of propylene hydrogenation on platinum–alumina
D. Hesse and **M. Hoffmeister**	2263	H5. Advantages and problems in characterizing SLP-catalysts by BET-surface area measurements
J. L. Sørensen, H. Livbjerg and **J. Villadsen**	2269	H6. Dual reactor investigation of SO_2-oxidation with a $V_2O_5/K_2S_2O_7$ catalyst
K. Hashimoto, T. Masuda and **T. Mori**	2275	H7. Kinetics of combustion of carbonaceous deposits on HZSM-5 zeolites
H. Delmas and **G. F. Froment**	2281	H8. A simulation model accounting for structural radial nonuniformities in fixed bed reactors
E. Wicke and **H. U. Onken**	2289	H9. Periodicity and chaos in a catalytic packed bed reactor for CO oxidation
T. Numaguchi and **K. Kikuchi**	2295	H10. Intrinsic kinetics and design simulation in a complex reaction network; steam–methane reforming
R. Shinnar	2303	Thermodynamic analysis in chemical process and reactor design
	2319	Author index
	2323	Keyword index
		Number 9
S. J. Han, H. M. Lin and **K. C. Chao**	2327	**Review Article Number 29. Vapor–liquid equilibrium of molecular fluid mixtures by equation of state**
I. Zafar and **P. E. Barker**	2369	An experimental and computational study of a biochemical polymerisation reaction in a chromatographic reactor separator

D. Barbosa and M. F. Doherty	2377	Design and minimum-reflux calculations for double-feed multicomponent reactive distillation columns
E.-U. Schlünder, W. Liedy, M. Tietz, R. Wagner and S. Kupka	2391	The desorption of a binary mixture from activated carbon and the resulting separation effect
W. R. B. W. Daud and W. D. Armstrong	2399	Residence time distribution of the drum dryer
C. A. Floudas and S. H. Anastasiadis	2407	Synthesis of distillation sequences with several multicomponent feed and product streams
S. Hartland and S. A. K. Jeelani	2421	Prediction of sedimentation and coalescence profiles in a decaying batch dispersion
M. Loewenberg and G. R. Gavalas	2431	Steady-state reactant flux into a medium containing spherical sinks
S. L. P. Lee and H. I. de Lasa	2445	Radial dispersion model for bubble phenomena in three-phase fluidized beds
M. P. Brungs, B. G. Madden and P. L. Seage	2451	Simulation and experimental studies of metastable states of peroxide reactions in stirred reactors
M. T. Ityokumbul, N. Kosaric and W. Bulani	2457	Parameter estimation with simplified boundary conditions
A. Burghardt, J. Rogut and J. Gotkowska	2463	Diffusion coefficients in bidisperse porous structures
M. M. El-Halwagi and M. A. El-Rifai	2477	Mathematical modeling of catalytic fluidized-bed reactors—I. The multistage three-phase model
P. K. Agarwal and B. K. O'Neill	2487	Transport phenomena in multi-particle systems—I. Pressure drop and friction factors: unifying the hydraulic-radius and submerged-object approaches
P. K. Agarwal	2501	Transport phenomena in multi-particle systems—II. Particle–fluid heat and mass transfer
P. K. Agarwal, W. J. Mitchell and R. D. La Nauze	2511	Transport phenomena in multi-particle systems—III. Active particle mass transfer in fluidized beds of inert particles
P. Cheng and D. Vortmeyer	2523	Transverse thermal dispersion and wall channelling in a packed bed with forced convective flow
K. Kikuchi, T. Sugawara and H. Ohashi	2533	Correlation of liquid-side mass transfer coefficient based on the new concept of specific power group
		Shorter Communications
A. Mehra and M. M. Sharma	2541	Simultaneous absorption of two gases with chemical reactions: selectivity variation in microheterogeneous media
V. M. H. Govindarao and K. V. S. Ramrao	2544	Prediction of location of particles in the wall region of a randomly packed bed of spheres
A. Brunovská	2546	Dynamic behaviour of catalyst pellet with step function activity distribution
E. T. Dionne and A. L. DeVera	2549	Global selectivity of periodically operated chemical reactors: sine-wave control of input volumetric flow rate in an isothermal CSTR with Van de Vusse kinetics

Book Review

D. C. Freshwater 2555 The Journal of Chemical Industry and Engineering (China), English Edition. Vol. 1, Parts 1 and 2

2557 Corrigenda

Announcement

2559 International Symposium on Gas Separation Technology

Number 10

iii Danckwerts–Maxwell Prize

P. D. McMahon, E. D. Glandt and J. S. Walker 2561 **Review Article Number 30. Renormalization group theory in solution thermodynamics**

K. Y. Choi and W. H. Ray 2587 The dynamic behavior of continuous stirred-bed reactors for the solid catalyzed gas phase polymerization of propylene

M. G. Schnitzlein and H. Weinstein 2605 Flow characterization in high-velocity fluidized beds using pressure fluctuations

K. J. Sene 2615 Air entrainment by plunging jets

A. Koshy, T. R. Das, R. Kumar and K. S. Gandhi 2625 Breakage of viscoelastic drops in turbulent stirred dispersions

K. Abdallah, Ph. Grenier, L. M. Sun and F. Meunier 2633 Nonisothermal adsorption of water by synthetic NaX zeolite pellets

T. Akiyama and H. Kurimoto 2645 Compressible gas model of vibrated particle beds

O. Iordache, V. Bologa and V. Pleşu 2655 Stability of solid–liquid dispersions

J. Munck, S. Skjold-Jørgensen and P. Rasmussen 2661 Computations of the formation of gas hydrates

D. J. Coyle 2673 Forward roll coating with deformable rolls: a simple one-dimensional elastohydrodynamic model

E.-U. Schlünder 2685 On the mechanism of the constant drying rate period and its relevance to diffusion controlled catalytic gas phase reactions

D. E. Rosner and H. M. Park 2689 Thermophoretically augmented mass-, momentum- and energy-transfer rates in high particle mass loaded laminar forced convection systems

H. Nishimura and M. Hirao 2705 Sequentialization of a graph as a sparse-matrix technique for predominantly tridiagonal matrices

R. A. Boaventura and A. E. Rodrigues 2715 Consecutive reactions in fluidized-bed biological reactors: modeling and experimental study of wastewater denitrification

C. G. Vayenas and S. Pavlou 2729 Optimal catalyst distribution for selectivity maximization in nonisothermal pellets: the case of parallel reactions

K. D. Wisecarver and L.-S. Fan 2741 Optimum particle size in a gas–liquid–solid fluidized bed catalytic reactor

J. Costes and J. P. Couderc 2751 Study by laser Doppler anemometry of the turbulent flow induced by a Rushton turbine in a stirred tank: influence of the size of the units—I. Mean flow and turbulence

J. Costes and J. P. Couderc	2765	Study by laser Doppler anemometry of the turbulent flow induced by a Rushton turbine in a stirred tank: influence of the size of the units—II. Spectral analysis and scales of turbulence
D. Herskowits, V. Herskowits, K. Stephan and A. Tamir	2773	Characterization of a two-phase impinging jet absorber—I. Physical absorption of CO_2 in water
R. Mihail and C. Singer	2781	Simulation of residence time distributions in a packing of equal spheres using a structural model for a fixed bed
B. W. Brooks	2795	Autocatalytic reactions in semi-batch reactors with no catalyst in the feed stream
M. Ahmed and R. W. Fahien	2801	Tubular reactor design—III. Three-dimensional model
S. T. Chou, L. T. Fan and R. Nassar	2807	Modeling of complex chemical reactions in a continuous-flow reactor: a Markov chain approach
A. Jeje and B. Ross	2817	The temperature field near a nozzle and the dynamics of saturated steam bubbles in subcooled water at low steady vapor supply rates
M. A. McKarnin, L. D. Schmidt and R. Aris	2833	Response of nonlinear oscillators to forced oscillations: three chemical reaction case studies
R. S. Parnas and D. T. Allen	2845	Compound class modeling of hydropyrolysis
C.-S. Yoo and A. G. Dixon	2859	Modelling and simulation of a mixed-flow reactor for ammonia and methanol synthesis
S.-A. Chen and B. G. Higgins	2867	Study of the flow in the upstream bank of liquid in a forward roll coater by the finite-element method
G. Carta	2877	Exact analytic solution of a mathematical model for chromatographic operations
		Shorter Communications
G. Kluge and G. Nagel	2885	Modelling of non-isothermal multi-component adsorption in adiabatic fixed beds—III. Some remarks on the type-III adsorption process
A. Bhattacharya, R. V. Gholap and R. V. Chaudhari	2890	An analysis of gas absorption accompanied by an exothermic consecutive reaction
K. Tsuchiya and L.-S. Fan	2893	Prediction of the wake size of a single gas bubble in liquid and/or liquid–solid media—the pendulum model
D. D. Do and R. G. Rice	2897	A mathematical formulation of diffusion for non-equilibrium adsorption in a single particle
L. G. Gibilaro, R. Di Felice and P. U. Foscolo	2901	A circulating liquid fluidised bed
S. R. Bhutada and V. G. Pangarkar	2904	Gas induction and hold-up characteristics of liquid jet loop reactors: power law fluids
H. Hikita, S. Asai and Y. Konishi	2907	A criterion for gas supersaturation in simultaneous absorption and desorption with an instantaneous irreversible reaction
		Book Reviews
L. G. Gibilaro	2911	Chemical Reactor Design. By E. B. Nauman
F. S. Gill	2911	Health Hazard Control in the Chemical Process Industry. By S. Lipton and J. Lynch

J. H. Harker	2912	Recent Developments in Chemical and Plant Design. Edited by Y. A. Liu, H. A. McGee, Jr and W. R. Epperly
J. D. Boyle	2913	Computer Control in the Process Industries. By B. Roffel and P. Chinn
	2915	Errata
		Announcement
	2917	Computer Integrated Process Engineering CIPE '89

Number 11

G. H. Crapiste, S. Whitaker and E. Rotstein	2919	Drying of cellular material—I. A mass transfer theory
G. H. Crapiste, S. Whitaker and E. Rotstein	2929	Drying of cellular material—II. Experimental and numerical results
O. E. Agamennoni, A. C. Desages and J. A. Romagnoli	2937	Robust controller design methodology for multivariable chemical processes
H. J. Viljoen, J. E. Gatica and V. Hlavacek	2951	Induction times for thermal explosion and natural convection in porous media
G. Vaporciyan, A. Annapragada and E. Gulari	2957	Rate enhancements and quasi-periodic dynamics during forced concentration cycling of CO and O_2 over supported Pt–SnO_2
H. Moon and C. Tien	2967	Adsorption of gas mixtures on adsorbents with heterogeneous surfaces
M. Sahimi	2981	Diffusion-controlled reactions in disordered porous media—I. Uniform distribution of reactants
R. Mojaradi and M. Sahimi	2995	Diffusion-controlled reactions in disordered porous media—II. Nonuniform distribution of reactants
G. D. Focht, P. V. Ranade and D. P. Harrison	3005	High-temperature desulfurization using zinc ferrite: reduction and sulfidation kinetics
J. C. Kayser and K. S. Knaebel	3015	Integrated steps in pressure swing adsorption cycles
A. Gawdzik and L. Rakowski	3023	Dynamic properties of the adiabatic tubular reactor with switch flow
J. Tobiś and D. Ziółkowski	3031	Modelling of heat transfer at the wall of a packed-bed apparatus
G. F. Barreto, G. D. Mazza and J. G. Yates	3037	The significance of bed collapse experiments in the characterization of fluidized beds of fine powders
A. M. Gadalla and B. Bower	3049	The role of catalyst support on the activity of nickel for reforming methane with CO_2
H. Arastoopour, C. S. Huang and S. A. Weil	3063	Fluidization behavior of particles under agglomerating conditions
S. J. Parulekar, R. S. Waghmare and H. C. Lim	3077	Yield optimization for multiple reactions
C. S. Ho, L.-K. Ju, R. F. Baddour and D. I. C. Wang	3093	Simultaneous measurement of oxygen diffusion coefficients and solubilities in electrolyte solutions with a polarographic oxygen electrode

Shorter Communication

I. Mészáros and Z. Fonyó 3109 A simple heuristic method to select heat-integrated distillation schemes

Letters to the Editors

A. K. Bin 3113 Comments on the effect of diffusivity on gas–liquid mass transfer in stirred vessels. Experiments at atmospheric and elevated pressures

G. F. Versteeg 3114 Author's reply to comments by A. K. Bin

Book Reviews

O. E. Potter 3115 Reactions & Reaction Engineering. Edited by R. A. Mashelkar and R. Kumar

N. Hallas 3115 Crystallization and Precipitation. Edited by G. L. Strathdee, M. O. Klein and L. A. Mellis

3117 Corrigenda

Number 12

A. Vetere 3119 An empirical model for calculating second virial coefficients

J.-L. Liow and N. B. Gray 3129 A model of bubble growth in wetting and non-wetting liquids

V. Srinivasan and R. C. Aiken 3141 Mass transfer to droplets formed by the controlled breakup of a cylindrical jet—physical absorption

M. Jaroniec, J. Choma, A. Swiatkowski and K. H. Radeke 3151 Application of isotherm equation associated with gamma micropore-size distribution for characterizing activated carbons

G. C. Glatzmaier and W. F. Ramirez 3157 Use of volume averaging for the modeling of thermal properties of porous materials

J. I. Ramos 3171 Liquid curtains—I. Fluid mechanics

G. H. Graaf, E. J. Stamhuis and A. A. C. M. Beenackers 3185 Kinetics of low-pressure methanol synthesis

M. P. Harold 3197 Steady-state behavior of the nonisothermal partially wetted and filled catalyst

L. Nilsson 3217 Influence of solids dispersion on the heat transfer process in a longitudinal-flow fluidized bed

H. Nasr-El-Din, J. H. Masliyah, K. Nandakumar and D. H.-S. Law 3225 Continuous gravity separation of a bidisperse suspension in a vertical column

A. C. Hindmarsh and S. H. Johnson 3235 Dynamic simulation of reversible solid–fluid reactions in nonisothermal porous spheres with Stefan–Maxwell diffusion

Shorter Communication

S. Sircar and A. L. Myers 3259 Determination of surface area and pore volume of adsorbents from adsorption isotherms of binary liquid mixtures

i Index to Vol. 43, 1988